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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/587,435

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Joachim Mahler

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DICKE, BILLIG & CZAJA

FIFTH STREET TOWERS

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MINNEAPOLIS, MN 55402

EXAMINER

SNOW, COLLEEN ERIN

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/587,435	<b>Applicant(s)</b> MAHLER, JOACHIM	
	<b>Examiner</b> Colleen E. Snow	<b>Art Unit</b> 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 25-50 is/are pending in the application.
- 4a) Of the above claim(s) 26, 28 and 42-48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25, 29-32, 34-38, 40, 41, 49 and 50 is/are rejected.
- 7) ☒ Claim(s) 27, 33 and 39 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>07/27/06 and 11/30/06</u> . | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### *Election/Restrictions*

1. Claims 26, 28 and 42-48 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected species and a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 27 May 2010.

Although not acknowledged by Applicant's response, claims 26 and 28 are hereby withdrawn as belonging to nonelected species Ia and Ic.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 25, 29, 30, 34-36, 40, 41, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Choi** (USPN 6,635,138) in view of **Rubinstein et al** (USPN 5,108,573) and **Goda et al** (USPN 6,506,868).

Regarding claim 25, **Choi** discloses a semiconductor housing comprising:

a leadframe which is intended to be equipped with a semiconductor chip **3** [see Fig. 3, see also col. 1, lines 55-59]; and

a polymer layer **2** applied as an adhesive layer to the leadframe, the polymer layer comprising at least one polymer from the group of fluorinated polyimides, polyisocyanates, polyamidocarboxylic

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esters of polyamide-silicone block copolymers, polyamide imides having silanes in the polymer chain or polyimide-silicone copolymers having silanes in the copolymer chain [see col. 1, line 60 to col. 2, line 6, wherein the adhesive layer is a polyamide imide].

**Choi** does not specifically disclose wherein the lead frame is to be enveloped with a polymer material, wherein the adhesive polymer layer has end groups which are aligned towards the polymer material and end groups which are aligned toward a flat conductor, nor wherein the polyamide imides have silanes in the polymer chain. **Rubinstein et al** disclose a method of providing a polymer layer **12** as an adhesive between a conductor layer **10** and a polymer material **14** [see Fig. 2; see also col. 3, lines 35-46], the adhesive polymer layer **12** having end groups (i.e.  $\text{NH}_2$ ) which are aligned toward the polymer material **14** and end groups (i.e.  $\text{SH}$ ) which are aligned toward a flat conductor **10** [see Figs. 1 and 2]. It would have been obvious to one of ordinary skill in the art at the time of invention to provide a polymer envelope, such as that which is well known in the art to be used as an encapsulant, in order for said envelope to act as protection for a semiconductor chip mounted on a leadframe. Furthermore, it would have been obvious to use a polymer that has end groups which are aligned towards the polymer material and end groups which are aligned toward a flat conductor in order to promote the adhesion of the polymer layer to the adjacent layers.

Finally, **Goda et al** disclose an adhesive polyamide imide having silanes in the polymer chain [see col. 15, lines 10-15]. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the polyamide imide with silane in the polymer chain because **Goda et al** teach that said silane-modified polymer has increased heat resistance [see col. 1, lines 27-30].

Regarding claim 29, the prior art of **Choi**, **Rubinstein et al** and **Goda et al** disclose the semiconductor housing of claim 25. Furthermore regarding the silane-modified adhesive polymer layer, **Goda et al** disclose wherein the polymer layer additionally comprises, for example, imidazoles

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or siloxanes [see col. 2, line 21 to col. 3, line 2, wherein anhydrides for use in forming said polymers are disclosed, wherein 2-(3',4'-dicarboxyphenyl) 5,6-dicarboxybenzimidazole dianhydride is disclosed to be a useful anhydride].

Regarding claim 30, the prior art of **Choi**, **Rubinstein et al** and **Goda et al** disclose the semiconductor housing of claim 25. Furthermore regarding the silane-modified adhesive polymer layer, **Goda et al** disclose wherein the polymer layer has, in the main chains and/or side chains, additionally one or more of the following functional groups: an amino group, a carboxyl group or a hydroxyl group [see col. 9, lines 12-15].

Regarding claim 34, the prior art of **Choi**, **Rubinstein et al** and **Goda et al** disclose the semiconductor housing of claim 25. Furthermore regarding the silane-modified adhesive polymer layer, **Goda et al** disclose wherein the polymer layer comprises a solvent [see col. 6, lines 40-46].

Regarding claim 35, **Choi** discloses a semiconductor comprising:

an unencapsulated semiconductor component **3** [see Fig. 3, see also col. 1, lines 55-59]; and  
a polymer layer **2** being applied to the unencapsulated semiconductor component, wherein the polymer layer comprises at least one polymer from the group of fluorinated polyimides, polyisocyanates, polyamidocarboxylic esters of polyamide-silicone block copolymers, polyamide imides having silanes in the polymer chain or polyimide-silicone copolymers having silanes in the copolymer chain [see col. 1, line 60 to col. 2, line 6, wherein the adhesive layer is a polyamide imide].

**Choi** does not specifically disclose wherein semiconductor component is provided with a polymer material to envelope it, wherein the adhesive polymer layer has end groups which are aligned towards the polymer material and end groups which are aligned toward a flat conductor, nor wherein the polyamide imides have silanes in the polymer chain. **Rubinstein et al** disclose a method of providing a polymer layer **12** as an adhesive between a conductor layer **10** and a polymer material

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**14** [see Fig. 2; see also col. 3, lines 35-46], the adhesive polymer layer **12** having end groups (i.e.  $\text{NH}_2$ ) which are aligned toward the polymer material **14** and end groups (i.e.  $\text{SH}$ ) which are aligned toward a flat conductor **10** [see Figs. 1 and 2]. It would have been obvious to one of ordinary skill in the art at the time of invention to provide a polymer envelope, such as that which is well known in the art to be used as an encapsulant, in order for said envelope to act as protection for a semiconductor chip mounted on a leadframe. Furthermore, it would have been obvious to use a polymer that has end groups which are aligned towards the polymer material and end groups which are aligned toward a flat conductor in order to promote the adhesion of the polymer layer to the adjacent layers.

Finally, **Goda et al** disclose an adhesive polyamide imide having silanes in the polymer chain [see col. 15, lines 10-15]. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the polyamide imide with silane in the polymer chain because **Goda et al** teach that said silane-modified polymer has increased heat resistance [see col. 1, lines 27-30].

Regarding claim 36, the prior art of **Choi, Rubinstein et al** and **Goda et al** disclose the semiconductor of claim 35. Furthermore regarding the silane-modified adhesive polymer layer, **Goda et al** disclose wherein the polymer layer additionally comprises, for example, imidazoles or siloxanes [see col. 2, line 21 to col. 3, line 2, wherein anhydrides for use in forming said polymers are disclosed, wherein 2-(3',4'-dicarboxyphenyl) 5,6-dicarboxybenzimidazole dianhydride is disclosed to be a useful anhydride].

Regarding claim 40, the prior art of **Choi, Rubinstein et al** and **Goda et al** disclose the semiconductor of claim 35. Furthermore regarding the silane-modified adhesive polymer layer, **Goda et al** disclose wherein the polymer layer comprises a solvent [see col. 6, lines 40-46].

Regarding claim 41, the prior art of **Choi, Rubinstein et al** and **Goda et al** disclose the semiconductor of claim 35. Furthermore, **Choi** discloses wherein the semiconductor component is a

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semiconductor chip **3**; furthermore, as disclosed above, **Rubinstein et al** disclose wherein a polymer layer **14** is provided; it would have been obvious to one of ordinary skill in the art at the time of invention to provide a polymer envelope, such as that which is well known in the art to be used as an encapsulant, in order for said envelope to act as protection for a semiconductor chip mounted on a leadframe.

Regarding claim 49, **Choi** discloses a structure comprising:

a leadframe [see Fig. 3, see also col. 1, lines 55-59];

means for equipping the leadframe with a semiconductor chip **3**, a polymer being applied as an adhesive layer **2** to the leadframe, and the polymer layer comprising at least one polymer from the group of fluorinated polyimides, polyisocyanates, polyamidocarboxylic esters of polyamide-silicone block copolymers, polyamide imides having silanes in the polymer chain or polyimide-silicone copolymers having silanes in the copolymer chain [see col. 1, line 60 to col. 2, line 6, wherein the adhesive layer is a polyamide imide].

**Choi** does not specifically disclose wherein the lead frame is to be enveloped with a polymer material, wherein the adhesive polymer layer has end groups which are aligned towards the polymer material and end groups which are aligned toward a flat conductor, nor wherein the polyamide imides have silanes in the polymer chain. **Rubinstein et al** disclose a method of providing a polymer layer **12** as an adhesive between a conductor layer **10** and a polymer material **14** [see Fig. 2; see also col. 3, lines 35-46], the adhesive polymer layer **12** having end groups (i.e.  $\text{NH}_2$ ) which are aligned toward the polymer material **14** and end groups (i.e.  $\text{SH}$ ) which are aligned toward a flat conductor **10** [see Figs. 1 and 2]. It would have been obvious to one of ordinary skill in the art at the time of invention to provide a polymer envelope, such as that which is well known in the art to be used as an encapsulant, in order for said envelope to act as protection for a semiconductor chip

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mounted on a leadframe. Furthermore, it would have been obvious to use a polymer that has end groups which are aligned towards the polymer material and end groups which are aligned toward a flat conductor in order to promote the adhesion of the polymer layer to the adjacent layers.

Finally, **Goda et al** disclose an adhesive polyamide imide having silanes in the polymer chain [see col. 15, lines 10-15]. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the polyamide imide with silane in the polymer chain because **Goda et al** teach that said silane-modified polymer has increased heat resistance [see col. 1, lines 27-30].

Regarding claim 50, the prior art of **Choi**, **Rubenstein et al** and **Goda et al** disclose the method of claim 49. Furthermore, **Choi** discloses further comprising the semiconductor chip **3** [see Fig. 3].

4. Claims 31, 32, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Choi** (USPN 6,635,138) in view of **Rubinstein et al** (USPN 5,108,573) and **Goda et al** (USPN 6,506,868) as applied to claims 25, 29, 30, 34-36, 40, 41, 49 and 50 above, and further in view of **Watanabe** (USPN 4,847,353).

Regarding claims 31, 32, 37 and 38, the prior art of **Choi**, **Rubenstein et al** and **Goda et al** disclose the semiconductor housing and the semiconductor of claims 25 and 35, respectively. None of **Choi**, **Rubenstein et al** and **Goda et al** disclose wherein the polymer precursor comprises one or more copolymers or a mixture of two or more polymers. **Watanabe** discloses a polyamide imide adhesive film, wherein said polyamide imide is modified with silane in order to increase the adhesive strength [see col. 10, lines 52-63]; furthermore, **Watanabe** discloses wherein the polyamide imide is formed from precursors comprising one or more copolymers, i.e. a mixture of polymers **III** and **IV** [see col. 5, lines 32-68]. It would have been obvious to one of ordinary skill in the art to look to one



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such as **Watanabe**, in the absence of detailed instructions by **Goda et al**, for a teaching of the method of forming the polyamide imide layer. Furthermore, it has been held that simple substitution of one known method for another to obtain predictable results is obvious. See *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (2007).

### ***Allowable Subject Matter***

5. Claims 27, 33 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: regarding claim 27, the prior art of record fails to teach or make reasonably obvious wherein each 2<sup>nd</sup> to 10<sup>th</sup> free acid group of the polyamide imide have reacted chemically with an amino group of a silane. While **Goda et al** disclose modifying a polyamide imide for use as an adhesive, **Goda et al** do not disclose the specifics of the position of the silane in the polymer chain of the polyamide imide; regarding claims 33 and 39, the prior art of record fails to teach or make reasonably obvious wherein the polymer layer has one or more plies, each ply comprising one or more polymers.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen E. Snow whose telephone number is (571)272-8603. The examiner can normally be reached on Monday through Friday, 8:00 AM to 5:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Landau can be reached on (571) 272-1731. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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